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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,955	10/29/2004	Kazunori Kobayashi	261119US90PCT	5313

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

ARMSTRONG, ANGELA A

ART UNIT	PAPER NUMBER
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2626

NOTIFICATION DATE	DELIVERY MODE
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10/08/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/510,955	Applicant(s) KOBAYASHI ET AL.	
	Examiner ANGELA A. ARMSTRONG	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-8 and 10-21 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/29/04;08/02/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on October 29, 2004 and August 2, 2006 are being considered by the examiner.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 10 and 21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 10 and 21 are directed to a sound acquisition computer Program. A computer program does not fall within one of the statutory classes of invention and are not subject matter eligible for patent protection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 5, 7, 8, 10-14, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balan (US Patent No. 7,218,741) in view of Marash (WO 01/37435).

Art Unit: 2626

5. Balan discloses a system and method for adaptive multi-sensor arrays. Regarding claims 1 and 7-8, Balan teaches a sound acquisition method (and provides support for an apparatus at element 401) for acquiring sound from each sound source by microphones of plural channels (col. 4, line 66) according to the present invention, comprising: (a) a state deciding step including an utterance deciding step of deciding an utterance period from signals received by said plural-channel microphones (col. 3, lines 60-63 – the voice activity detector); (b) a sound source position detecting step of detecting the position of said each sound source from said received signals when the utterance period is decided in said utterance deciding step (col. 3, lines 60-63); (c) a frequency domain converting step of converting said received signals to frequency domain signals (col. 5, lines 13-14); (d) a covariance matrix calculating step of calculating a covariance matrix of said frequency domain received signals (col. 5, lines 3-31); (e) a covariance matrix storage step of storing said covariance matrix for each sound source based on the result of detection in said sound position detecting step (col. 5, lines 3-31-- covariance matrix is updated). Balan does not teach calculating filter coefficients, filtering the received signals of said plural channels by the calculated filter coefficients of said plural channels, respectively; and adding together the results of filtering in said plural channels, and providing the added output as a send signal. Marash teaches a system for beamforming design and implementation and provides for generating filter coefficients determined by a covariance matrix, summing the outputs of the beamformer (page 13, line 23 to page 14, line 5) and processing of the noise covariance matrix (page 14, line 18 to page 15, line 3). Marash teaches the filter coefficients are set so as to maximize the signal to noise ratio of the desired signal (page 7, lines 1-3). It would have been

Art Unit: 2626

obvious to modify the system Balan to implement the filter coefficient processing suggested by Marash, for the purpose of enhancing the received signal by maximizing the signal to noise ratio.

6. Regarding claim 5, the combination of Balan and Marash disclose assigning weights to the sound sources (page 6, lines 1-20).

7. Regarding claim 10, Balan discloses the system can be implemented in software (col. 4, lines 21-28).

8. Regarding claims 11 and 16-17, Balan teaches a sound acquisition method (and provides support for an apparatus at element 401) for acquiring sound from at least one sound source by microphone (col. 4, line 66) and teaches (a) deciding an utterance period from signals received (col. 3, lines 60-63 – the voice activity detector); a frequency domain converting step of converting said received signals to frequency domain signals (col. 5, lines 13-14); a covariance matrix calculating step of calculating a covariance matrix of said frequency domain received signals (col. 5, lines 3-31); a covariance matrix storage step of storing said covariance matrix for each sound (col. 5, lines 3-31-- covariance matrix is updated). Balan does not teach receiving signals from a loudspeaker, calculating filter coefficients, filtering the received signals, cancelling an echo sound; and adding together the results of filtering in said plural channels, and providing the added output as a send signal. Marash teaches a system for beamforming design and implementation and provides for generating filter coefficients determined by a covariance matrix, summing the outputs of the beamformer (page 13, line 23 to page 14, line 5), processing the signals to perform echo cancelling (page 24, line 21 to page 26, line 8) and processing of the noise covariance matrix (page 14, line 18 to page 15, line 3). Marash teaches the filter coefficients are set so as to maximize the signal to noise ratio of the desired signal (page 7, lines

Art Unit: 2626

1-3). It would have been obvious to modify the system Balan to implement the filter coefficient and echo cancellation processing suggested by Marash, for the purpose of enhancing the received signal by maximizing the signal to noise ratio.

9. Regarding claims 12 and 19, the combination of Balan and Marash teach said state decision step includes a step of deciding a noise period from said acquired signal and said received signal; said covariance matrix calculating step includes a step of calculating a covariance matrix in said noise period; said covariance matrix storing step includes a step of storing said covariance matrix in said noise period; and said filter coefficient calculating step calculates received signal filter coefficients of said at least one channel and said acquired signal filter coefficients based on said stored covariance matrices in said utterance period, said receiving period and said noise period so that said acoustic echo and noise are cancelled (page 15, lines 1-3 and page 24, line 21 to page 26, line 8 – the system determines the noise covariance matrix and implements echo cancellation in the adaptive filter beamformer process).

10. Regarding claims 13 and 18, the combination of Balan and Marash teach a microphone for plural channels (col. 4, line 66) and sound source detecting for detecting the sound source position (col. 3, lines 60-63).

11. Regarding claims 14 and 20, the combination of Balan and Marash disclose assigning weights to the sound sources (page 6, lines 1-20).

12. Regarding claim 21, Balan discloses the system can be implemented in software (col. 4, lines 21-28).

Art Unit: 2626

13. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balan in view of Marash and further in view of Sim (US Patent No. 6,771,219).

14. Regarding claims 6 and 15, Balan does not teach multiplying the covariance matrix by a weight based on the diagonal component and a matrix. Sim discloses an adaptive beamforming method which vector weights are updated based on a diagonal matrix component (col. 3, line 27 to col. 4, line 4). Sim teaches the system provides adaptive beamforming methods capable of reducing computational load. It would have been obvious to one of ordinary skill at the time of the invention to modify the system of Balan, as modified by Marash, and to implement the matrix weighting as taught by Sim, because such a modification would generate the beamforming adaptive weighting with a reduction in processing and computational loads.

Allowable Subject Matter

15. Claims 2-4 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17. Balan (US Patent No. 7,158,433)

Art Unit: 2626

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANGELA A. ARMSTRONG whose telephone number is (571)272-7598. The examiner can normally be reached on Monday-Thursday 11:30-8:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick N. Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Angela A Armstrong/
Primary Examiner, Art Unit 2626